TSPH

TSPH DIGITAL GURU

NEET Actual Test 2021
Physics Solution
CODE: O6

www.tsph.in

25 Students Above 95% (NTA SCORE)

2021 JEE MAINS (Feb & March Attempt)

Unnati Singh

99.83%

Dev Goti

99.20%

SANYAM C.

98.92%

TUSHAR R.

98.86%

JANAM K.

98.45%

SAHIL K.

98.27%

2021 JEE MAINS (Feb & March Attempt)

BHAVANI J.
97.75%

ADITYA M.
97.66%

DHRUVIL S.
97.66%

DEEPAM S.
97.64%

PREET J.
97.28%

PAVAN A.
97.15%

ADITYA J.
96.98%

TANVI D.
96.97%

MEET R.
96.90%

HARSH S.
96.53%

KESHAV S.
96.33%

KUNAL G.
96.19%

UTSAV A.
96.17%

JENIL S.
95.95%

HEET B.
95.95%

SNEHA M.
95.80%

DEEPALI D.
95.36%

JIGAR S.
95.30%

AKASH M.
95.28%

#NEET - 2020 RESULTS

GOVT.-MBBS SELECTIONS

665 / 720

KHUSHBOO R.

KEM, MUMBAI

MAUNIK MODI

641 / 720

LTMMC, MUMBAI

PAWAN MODI

638 / 720

COOPER, MUMBAI

KALASH S.

630 / 720

GMC, MUMBAI

HEMLATA P.

626 / 720

COOPER, MUMBAI

#NEET - 2020 RESULTS

GOVT.-MBBS SELECTIONS

LUCKY D.
626 / 720
COOPER, MUMBAI

SHUBH D.
615 / 720
IGMC, NAGPUR

SUMAN S.
611 / 720
COOPER, MUMBAI

SHASHANK D.
608 / 720
GMC, MIRAJ

SHRUTI P.
605 / 720
GMC, KOLHAPUR

SUBHJYOTI J.
591 / 720
GMC, SOLAPUR

SHRIRANG S.
585 / 720
GMC, JALGAON

SHUBHAM PAL
584 / 720
GMC, AKOLA

LOKESH JHA
582 / 720
GMC, AMBAJOGAI

ANSHIKA M.
581 / 720
GMC, JALGAON

DRASHTI S.
502 / 720
GMC, MIRAJ

28
Students Above 500 Score

2020 JEE & MHCET

DAKSH P.

IIIIT, JABALPUR

JEE 98.27%

MHCET 99.75%

SEJAL C.

NIT, SURAT

JEE 97.02%

MHCET 99.92%

DIVYASHREE R.

NIT, SURAT

JEE 96.13%

MHCET 99.88%

AYUSH S.

BIT MESRA, RANCHI

JEE 94.54%

SHRUTI S.

NIT, RAIPUR

*PWD CATEGORY

% indicates percentile score

2020 JEE & MHCET

MOHIT SHARMA

VJTI, MUMBAI

MHCET - 99.98%

JEE - 95.33%

VIKAS G.

MHCET 99.31%

D.J. SANGHVI

SHYAM B.

MHCET 99.23%

D.J. SANGHVI

VIKRAM S.

MHCET 99.08%

D.J. SANGHVI

KARAN P.

MHCET 99.07%

WALCHAND

AYUSH J.

MHCET 98.97%

D.J. SANGHVI

DEEP P.

MHCET 98.77%

D.J. SANGHVI

NITESH B.

MHCET 98.49%

D.J. SANGHVI

KHUSHI M.

MHCET 98.41%

D.J. SANGHVI

DEEPTI S.

MHCET 98.09%

D.J. SANGHVI

TSPH HAI TO MUMKIN HAI

TSPH DIGITAL GURU

CLASS ON CLICK

Anytime access to pre recorded videos from anywhere.

TEACHER ON TIP

Video solutions of MCQs will be just a click away !

CBT

Online Computer Based Testing.

REAL TIME ANALYTICS

Time, difficulty level & performance analysis report on dashboard

MY MISTAKE BOOK

Customised digital book, keeping track of your mistakes.

DIGITAL LIBRARY

Challenge rounds, tutorial sheet & assignments for rigorous practice.

The Science Private's Hub

NEET 2021
Physics Solution
CODE – O6

Physics

1. (1) current in n-type > current in p-type

2. (4) $S_{n+h} = \frac{1}{2}a(2n-1) - (i)$

$S_{(n+1)^{+h}} = \frac{1}{2}a[2(n+1)-1]$

$= \frac{1}{2}a[2n+2-1]$

$= \frac{1}{2}a(2n+1) - (ii)$

Form eq (i) and (ii)

$$\frac{S_{n+h}}{S_{n+1}} = \frac{2n-1}{2n+1}$$

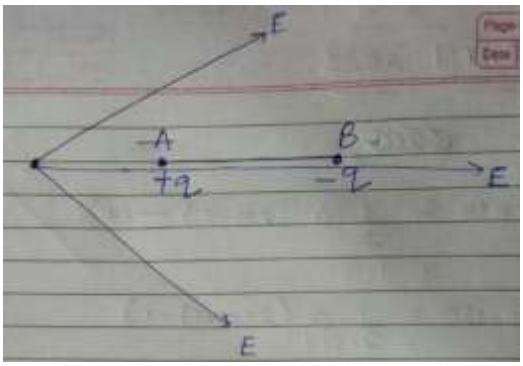
3. (2) $V_e = \sqrt{\frac{2GM}{R}} = \sqrt{\frac{2.G.\rho}{R}\frac{4}{3}\pi R^3}$

$V_e = \sqrt{\frac{8G\pi\rho R^2}{3}}$

$\frac{V_{e(P)}}{V_{e(E)}} = \sqrt{\frac{\rho_P}{\rho_E}}.\frac{R_P}{R_E} = 4$

$\therefore$ $V_{e(P)} = 4$ V

4. (4)



Electric field is string at A than B

$\therefore$ $F_{at\ A} > F_{at\ B}$

5. (2) $V = \sqrt{V_R^2 + (V_L - V_C)^2}$

$= \sqrt{(40)^2 + (40-10)^2}$

= 50 volt

$V_0 = \sqrt{2}\,V = 50\sqrt{2}$

$I_0 = \frac{V_0}{Z} = Z = \frac{50\sqrt{2}}{10\sqrt{2}} = 5\Omega$

6. (2) having a permanent electric dipole moment

7. (2) Pitch = 1 mm

$LC = \frac{Pitch}{n} = \frac{1}{100} = 0.01mm$

Reading = main scale Reading + n × Lc

= 0 + 52 × 0.01

= 0.052 cm

8. (4) $\frac{A}{A_0} = \left(\frac{1}{2}\right)^{\frac{T}{T_{1/2}}}$

$= \left(\frac{1}{2}\right)^{\frac{150}{100}} = \left(\frac{1}{2}\right)^{3/2}$

$= \frac{1}{2\sqrt{2}}$

9. (1) $\eta = \frac{p\cdot\lambda}{hc}$

$= \frac{3.3\times10^{-3}\times600\times10^{-9}}{20\times10^{-26}}$

$= 99 \times 10^{14}$

$= 10^{16}$

10. (4) $\bar{c} = \bar{E}\times\bar{B}$

$\bar{c}$ is in + x direction $(\hat{i})$

11. (3)

Fg = mg = d.v.g

$F_B = \sigma.v.g = \frac{d}{2}.v.g$

$F_B = \frac{F_g}{2}$

When velocity becomes constant

$mg = F_B + F_V$

$\therefore \quad Mg = \frac{mg}{2} + F_v$

$\therefore \quad F_v = \frac{mg}{2}$

12. (1) $u = \frac{1}{2}cv^2$

$= \frac{1}{2}\left(\frac{A\varepsilon_0}{d}\right)(E\cdot d)^2 = \frac{1}{2}A \in_0 E^2 d$

13. (3) A-R, B-S, C-P, D-Q

14. (3) $\frac{E_2}{E_1} = \frac{\ell_2}{\ell_1}$

$\therefore \quad \frac{2.5}{1.5} = \frac{\ell_2}{36}$

$\therefore \quad \frac{25}{15} \times 36 = \ell_2$

$\therefore \quad \frac{5}{3} \times 36 = \ell_2$

$\therefore \quad \ell_2 = 60\text{cm}$

15. (2) $R_P = \frac{R}{4}$

$\therefore \quad 0.25 \times 4 = R$

$R = 1\ \Omega$

$R_S = 4R$

$= 4 \times 1$

$= 4\ \Omega$

16. (2) $F = q\ V\ B \sin\theta$

$= 1.6\times10^{-19}\times10^5\times\frac{\mu_0 I}{2\pi d}$

$= 1.6\times10^{-19}\times10^5\times2\times10^{-7}\times\frac{5}{0.2}$

$= 1.6 \times 2 \times 25 \times 10^{-21}$

$= 8 \times 10^{-20}\ N$

17. (3) $\frac{E}{G} = \frac{[M^1L^2T^{-2}]}{[M^{-1}L^3T^{-2}]}$

$= [M^2\ L^{-1}\ T^0]$

18. (1) $\lambda_d = \frac{h}{p} = \frac{h}{\sqrt{2ME}}$

$KE_{max} = \frac{hc}{\lambda} - \phi_0$

$\therefore \quad \lambda_d = \frac{h}{\sqrt{2m.\frac{hc}{\lambda}}}$

$\therefore \quad \lambda_d^2 = \frac{h^2.\lambda}{2mhc}$

$\therefore \quad \lambda = \left(\frac{2mc}{h}\right)\lambda_d^2$

19. (1) ${}^{A}_{Z}X \xrightarrow{\beta^+} {}_{Z-1}B \xrightarrow{\alpha} {}_{Z-3}C \xrightarrow{\beta^-} {}_{Z-2}$

20. (4) 2n

21. (2) $F = K \cdot X$

$10 = K \cdot 5 \times 10^{-2}$

$2 \times 10^2 = K$

$T = 2\pi\sqrt{\frac{m}{k}} = 2\pi\sqrt{\frac{2}{2\times10^2}}$

$= 2\pi\sqrt{10^{-2}}$

$= 6.28 \times 10^{-1}$

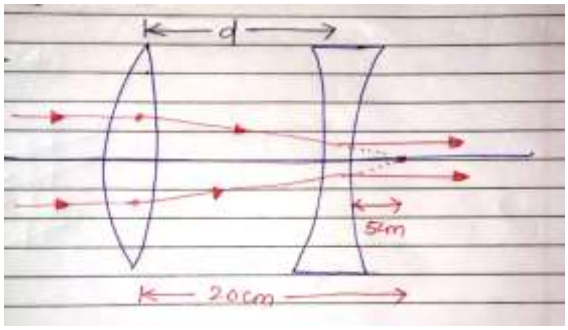
$= 0.628\ s$

22. (2) Energy released

$= 2 \times 120 \times 8.5 - 240 \times 7.6 = 216\ MeV$

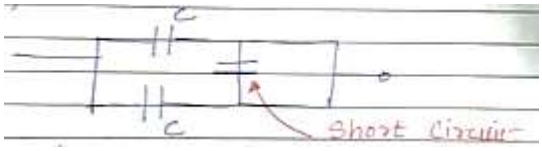
23. (4) All of the above

24. **(4)**



d = 20 – 5 = 15 cm

25. (4)



C and C are in parallel

$C_{eq} = 2C$

26. (3) $V = V_0 \sin \omega t$

for capacitance ckt

$$I = I_0 \sin\left(\omega t + \frac{\pi}{2}\right)$$

$$I = \frac{V_0}{Z}\sin\left(\omega t + \frac{\pi}{2}\right)$$

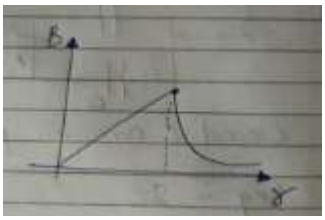
$I = \omega c v_0 \cos \omega t \left(\because \text{for capacitive ckt } Z = \frac{1}{\omega c}\right)$

27. (1) A is correct

B is incorrect

28. (1) $B_{in} \propto r$

$$B_{out} \propto \frac{1}{r^2}$$



29. (4) $\frac{d\theta}{dt} \propto (\theta - \theta_0)$

$$\therefore \quad \omega\left(\frac{d\theta}{dt}\right)_2 = \frac{\theta_2 - \theta_0}{\theta_1 - \theta_0}$$

$$\therefore \quad \frac{\left(\frac{20}{E'}\right)}{\left(\frac{10}{E}\right)} = \frac{\frac{80+60}{2} - 20}{\frac{90+80}{2} - 20}$$

$$\therefore \quad \frac{2t}{t'} = \frac{70-20}{85-20} = \frac{50}{65}$$

$$\therefore \quad \frac{2\times 65}{50}\cdot t = t'$$

$$\therefore \quad t' = \frac{13}{5}t$$

30. (4) $[E] = [F]^X [A]^Y [T]^Z$

$[M^1 L^2 T^{-2}] = [M^1 L^1 T^{-2}]^X [M^0 L^1 T^{-2}]^Y [M^0 L^0 T^1]^Z$

$[M^1 L^2 T^{-2}] = [M^x L^x T^{-2X}] [M^0 L^Y T^{-2Y}] [M^0 L^0 T^Z]$

$[M^1 L^2 T^{-2}] = [M^x L^{X+Y} T^{-2X-2Y+Z}]$

$\therefore \quad X = 1$

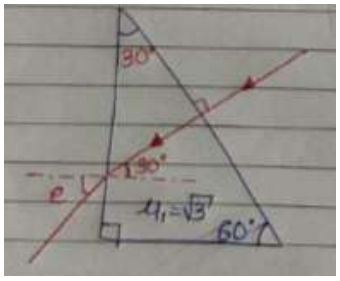
$X + Y = 2 \Rightarrow Y = 1$

$-2x - 2Y + Z = -2$

$\therefore \quad -2 - 2 + Z = -2 \Rightarrow Z = 2$

$[E] = [F^1 A^1 T^2]$

31. (3)



$\mu_2 = 1$

$$\sin i_c = \frac{1}{\mu} = \frac{1}{\sqrt{3}}$$

$i_c \simeq 35°$

$$\mu_c = \frac{\sin i}{\sin e} \Rightarrow \sin e = \frac{\sin 30}{\frac{\mu_2}{\mu_1}} = \frac{y_2}{\frac{1}{\sqrt{3}}}$$

$$\sin e = \frac{\sqrt{3}}{2} \Rightarrow e = 60°$$

32. (4)

P.E. = mgh

90% of P.E. is getting converted

$\therefore \quad P = \dfrac{90\%mgh}{t}$

$= 0.9 \times 15 \times 10 \times 60 = 8.1$ kw

33. (1) A-Q, B-P, C-S, D-R

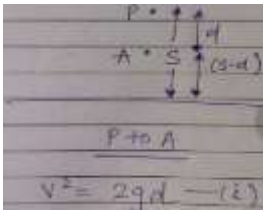
34. (2) $PE_i = mgs$

Let after falling a distance 'd'

At point A,

KE = 3PE

$\dfrac{1}{2}mv^2 = 3mg(s-d)$



$\therefore \quad \dfrac{1}{2}m(2gd) = 3mg(s-d)$

$\therefore \quad d = 3s - 3d$

$4d = 3s$

$D = 35/4$

Now, height from surface = (s – d)

$= s - \dfrac{3s}{4}$

$= \dfrac{1}{4}s$

From eq (i)

35. (4) $V_1 = V_2$ as connected by metal wire

$\dfrac{KQ_1}{R_1} = \dfrac{KQ_2}{R_2}$

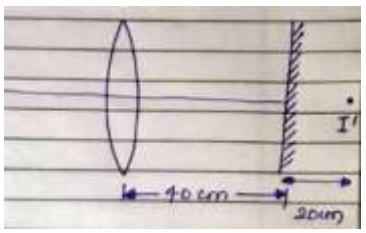
$\therefore \quad \dfrac{Q_1}{Q_2} = \dfrac{R_1}{R_2} \quad \ldots . (i)$

$\dfrac{\sigma_1}{\sigma_2} = \dfrac{Q_1}{Q_2} \cdot \dfrac{A_2}{A_1}$

$= \dfrac{Q_1}{Q_2} \cdot \left(\dfrac{R_2}{R_1}\right)^2 \quad = \dfrac{R_1}{R_2}\left(\dfrac{R_2}{R_1}\right)^2 = \dfrac{R_2}{R_1}$

36. (3) Image due to convex lens.1

$\dfrac{1}{v} - \dfrac{1}{u} = \dfrac{1}{f}$



$\therefore \quad \dfrac{1}{v} - \left(-\dfrac{1}{60}\right) = \dfrac{1}{30}$

$\therefore \quad \dfrac{1}{v} = \dfrac{1}{30} - \dfrac{1}{60} = \dfrac{1}{60}$

$\therefore$ v = 60 cm (20 cm from plane minor)

This will act as object for plane mirror.

now Image due to plane mirror

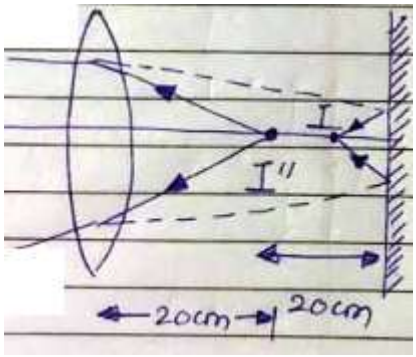
Object Distance = Image distance

$\therefore$ 20 cm from plane mirror

Now, This will act as object for convex lens

$\dfrac{1}{v} - \dfrac{1}{u} = \dfrac{1}{f}$

$\therefore \quad \dfrac{1}{v} - \dfrac{1}{20} = \dfrac{-1}{30}$



$\therefore \quad \dfrac{1}{v} = \dfrac{-1}{30} + \dfrac{1}{20} \Rightarrow$ V = 60 cm from Lens towards right or 20 cm from Mirror (Real)

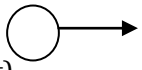
37. (3) $V_pI_p = V_sI_s$

$220 \times I_p = 11 \times \left(\dfrac{P}{V_s}\right)$

$220 \times I_P = 11 \times \dfrac{44}{11}$

$I_p = \dfrac{44}{220} = 0.2$ A

38. (2)



$u_x = v_x$ (constant)

$u_y = 0$

Velocity of ball in X direction = velocity of car at t = 4

$\therefore \quad V_x = 0 + at = 5 \times 4 = 20$ m/s

now, $V_y = U_y + a_yt$

$= 0 + 10 \times 2 = 20$ m/s

$V = \sqrt{V_x^2 + v_y^2} = 20\sqrt{2}$ m/s

free fall $a = g = 10\ m/s^2$

39. (3)

A	B	C	D		E	y
			A·B	B·C	B·C	D+E
0	0	0	0	0	1	1
0	0	1	0	0	1	1
0	1	0	0	0	1	1
0	1	1	0	1	0	0
1	0	0	0	0	1	1
1	0	1	0	0	1	1
1	1	0	1	0	1	1
1	1	1	1	1	0	1

40. (1) 46 rad/s and 54 rad/s

$$Q = \frac{X_L}{R} = \frac{\omega_0}{\Delta\omega} \Rightarrow$$

$$\frac{\omega_0 L}{R} = \frac{\omega_0}{\Delta\omega}$$

$$\Delta\omega = \frac{R}{L} = \omega_H - \omega_L$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{5\times 80\times 10^{-6}}} = 50 \text{ rad/s}$$

Now, half power frequencies are given as

$$\omega = \omega_0 \pm \frac{R}{2L}$$

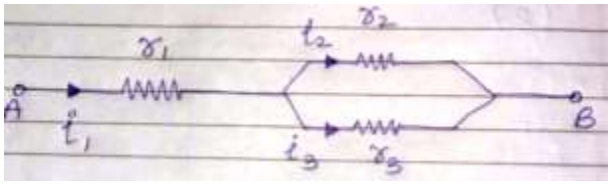
$$\omega_H = 50 + \frac{R}{2L} = 50 + \frac{40}{2\times 5} = 54 \text{ rad/s}$$

$$\omega_L = 50 - \frac{R}{2L} = 50 - \frac{40}{2\times 5} = 46 \text{ rad/s}$$

41. (2) When drops combine

$V = \eta^{2/3}\cdot v = (27)^{2/3}\cdot 220 = 9 \times 220 = 1980$ V

42. (4)



$$i_3 = \frac{r_2}{r_2 + r_3}\cdot i_1$$

$$\therefore \quad \frac{i_3}{i_1} = \frac{r_2}{r_2 + r_3}$$

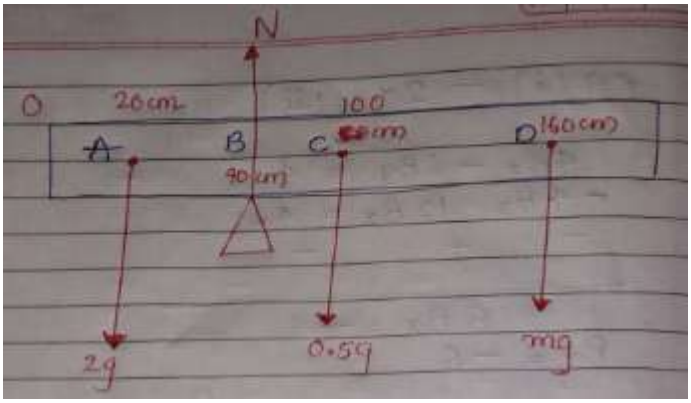
43. (4) $V = \sqrt{2gh} = \sqrt{2\times 10\times 10} = 10\sqrt{2}\,m/s$

$J = mv - mu$

$m = (10\sqrt{2} - (-10\sqrt{2}))$ ($\because$ Rebounds to same height $|v| = |u|$)

$= 2 \times 0.15 \times 10\sqrt{2} = 4.2$ kg m/s

44. **(2)**



$\tau_{net} = 0$ about point B

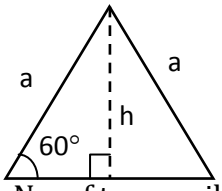
$\therefore \quad 2g \times 20 = 0.59 \times 0 + mg \times 120$

$\therefore \quad 40 = 30 + m \times 120$

$\therefore \quad 10 = m \times 120$

$\therefore \quad m = \frac{1}{12}$ kg

45. (3)



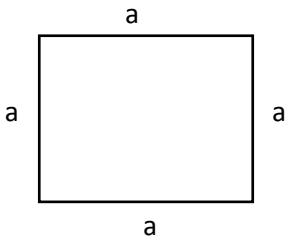
No. of turns will be 4

$$A = \frac{1}{2}\cdot a \cdot h$$

$$= \frac{1}{2}\cdot a \cdot a\frac{\sqrt{3}}{2}$$

$= \frac{\sqrt{3}\,a^2}{4}$

$NI \cdot A = \frac{4 \times \sqrt{3} Ia^2}{4} = \sqrt{3} Ia^2$



no. of turns will be 3

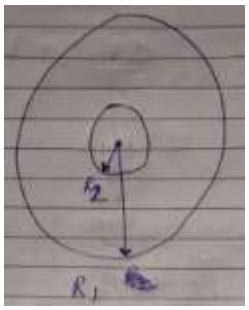
$A = a \cdot a = a^2$

$M = NI \cdot A = 3Ia^2$

46. (2)

$M = \frac{\mu_0 \pi N_1 N_2 R_2^2}{R_1}$

$M \propto \frac{R_2^2}{R_1}$



47. (3) MI of Ring = MR^2

MI of Remaining Ring = $MR^2 - \left(\frac{M}{4}\right)R^2$

$= \frac{3}{4}MR^2$

$\therefore \quad K = \frac{3}{4}$

48. (2) $PE_i + KE_i = PE_+ + KE_+$

$-\frac{GMm}{R} + \frac{1}{2}mv^2 = -\frac{GMm}{R+h} + o$

$\therefore \quad -\frac{2GM}{R} + V^2 = \frac{-2GM}{R+h}$

$\therefore \quad -Ve^2 + V^2 = -\frac{Ve^2 R}{R+h} \quad \left(\because V_e = \sqrt{\frac{2GM}{R}}\right)$

$\therefore \quad V^2 - Ve^2 = -\frac{Ve^2 R}{R+h}$

$\frac{R+h}{R} = \frac{-Ve^2}{K^2 Ve^2 - Ve^2} = \frac{-2}{K^2 - 1}$

$\therefore \quad 1 + \frac{h}{R} = \frac{1}{1-K^2}$

$\therefore \quad \frac{h}{R} = \frac{1}{1-K^2} - 1 = \frac{K^2}{1-K^2}$

$h = R\left(\frac{K^2}{1-K^2}\right)$

49. (4) $V = \frac{2\pi R}{T}$

$h = \frac{V^2 \sin^2\theta}{2g}$

$4R = h = \frac{4\pi^2 R^2 \sin^2\theta}{2g.T^2}$

$\therefore \quad 8Rg \cdot T^2 = \sin^2\theta$

$4\pi^2 R^2$

$\therefore \quad \frac{2gT^2}{\pi^2 R} = \sin^2\theta$

$\therefore \quad \theta = \sin^{-1}\sqrt{\frac{2gT^2}{\pi^2 R}}$

50. (4) $q(\vec{V} \times \vec{B}) = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 4 & 6 \\ B_x & B_Y & B_Z \end{vmatrix}$ $(\because q = k)$

$= \hat{i}(4B_z - 6B_y) - \hat{j}(2B_2 - 6B_x) + \hat{k}(2B_y - 4B_x)$

From given equation

$4B_z - 6\,B_y = 4$ (i)

$2B_z - 6\,B_x = 20$ (ii)

$2B_y - 4\,B_x = 12$ (iii)

Eq (i) $- 2 \times$ eq (ii)

$4B_z - 6B_y = 4$

$\frac{4B_z - 12B_x = 40}{6B_x = -36}$

$B_x = -6$